Second Five-Year Review Report

for

Du Pont County Road X-23 Site

Lee County, Iowa

August 2002

PREPARED BY:

U.S. Environmental Protection Agency
Region VII
Kansas City, Kansas

Approved by:

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Date:

8/16/02

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List of Acronyms

ARARs	applicable or relevant and appropriate requirements
ASTM	American Society for Testing and Materials
bgs	below ground surface
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm/sec	centimeter per second
EPA	Unites States Environmental Protection Agency
ESD	Explanation of Significant Differences
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
mg/l	milligram per liter
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and maintenance
PRGs	Preliminary remediation goals
psi	pounds per square inch
RA	Remedial Action
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RAOs	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
TCLP	Toxicity Characteristic Leaching Procedure
USC	Unconfined compressed strength
VOC	volatile organic compounds
µg/l	microgram per liter

Executive Summary

The Du Pont County Road X-23 Superfund site in Lee County, Iowa consists of two subsites, known as the Baier and McCarl subsites. The remedy for the site included stabilization and solidification of contaminated soil from both subsites into a solid monolith which was covered with a soil cap at the Baier subsite. The remedy also included groundwater monitoring and the implementation of covenants and deed notices on the future use of the subsites. The site achieved construction completion with the signing of the Preliminary Closeout Report on September 29, 1993. The site was deleted from the National Priorities List on September 25, 1995. The trigger for this five-year review was the signing of the First Five-Year Review Report on June 19, 1997.

The determination that has been made during this five-year review is that the remedy continues to function as designed. The immediate threats have been addressed and the remedy continues to be protective.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name *(from WasteLAN)*: E.I. Du Pont De Nemours & Co., Inc. (County Road X23)

EPA ID *(from WasteLAN)*: IAD980685804

Region: 7	**State:** IA	**City/County:** West Point/Lee County

SITE STATUS

NPL status: ☐ Final X Deleted ☐ Other (specify) _____

Remediation status (choose all that apply): ☐ Under Construction X Operating ☐ Complete

Multiple OUs?* ☐ YES X NO	**Construction completion date:** 09/29 /1993

Has site been put into reuse? ☐ YES X NO

REVIEW STATUS

Lead agency: X EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

Author name: Diana L. Engeman

Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA - Region 7

Review period:** 11/5/2001 to 8/16 /2002

Date of site inspection: 03/28/2002

Type of review:
X Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion

Review number: ☐ 1 (first) X 2 (second) ☐ 3 (third) ☐ Other (specify)

Triggering action:
☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____
☐ Construction Completion X Previous Five-Year Review Report
☐ Other (specify) _____

Triggering action date *(from WasteLAN)*: 06/19/1997

Due date *(five years after triggering action date)*: 06/19/2002

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

Failure to perform analysis of soil cover in 1999.

Schedule for future groundwater monitoring needs to be determined.

Schedule for future inspection and maintenance activities needs to be determined.

Recommendations and Follow-up Actions:

Soil cover at the Baier subsite to be sampled in 2002 and lime and fertilizer applied as needed.

At the Baier subsite, groundwater monitoring for total metals will continue biennially, including 2002, for the next five years in accordance with the Groundwater Monitoring Plan.

At the McCarl subsite, groundwater monitoring will be discontinued immediately and all monitoring wells properly abandoned per the Groundwater Monitoring Plan.

Routine inspection at both subsites to occur twice per year for next five years.

Soil cover at the Baier subsite to be sampled in 2005 and lime and fertilizer added as needed.

Protectiveness Statement: The remedy at the Du Pont County Road X-23 site is protective of human health and the environment.

Second Five-Year Review Report

I. Introduction

The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review Reports. In addition, Five-Year Review Reports identify issues found during the review, if any, and recommendations to address them.

The Agency is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(c) and the National Contingency Plan (NCP). CERCLA § 121(c) states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The agency interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR § 300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The United States Environmental Protection Agency (EPA) RegionVII has conducted a five-year review of the remedial actions implemented at the Du Pont County Road X-23 site in Lee County, Iowa. This review was conducted from November 2001 through July 2002. This report documents the results of the review.

This is the second five-year review for the Du Pont County Road X-23 site. The triggering action for this review is the date of the first five-year review, as shown in EPA's WasteLAN database: June 19, 1997. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain on the site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1
Chronology of Site Events

Event	Date
Initial discovery of contamination	11/1979
Removal actions	1990-1992
Final listing on National Priorities List (NPL)	8/30/1990
Remedial Investigation/Feasibility Study complete	1/1991
Proposed Plan available for public comment	4/1991
Record of Decision (ROD) signed	5/28/1991
Remedial design	10/1/1991
Consent Decree for RD/RA finalized	4/23/1992
ROD Explanation of Significant Differences (ESD) signed	5/11/1992
Remedial design completed	6/5/1992
Remedial action construction began	6/5/1992
Preliminary Close Out Report signed	9/29/1993
Final Close-out Report	8/1/1994
Deletion from NPL	9/25/1995
Previous five-year review	6/19/1997

III. Background

Physical Characteristics

The Du Pont County Road X-23 site, consisting of the Baier and McCarl subsites, is located in rural Lee County, Iowa, approximately 3.5 miles south of the town of West Point. The two subsites are located 0.75 miles apart, in Township 68 North and Range 5 West. The Baier subsite is located in the southwest quarter of Section 28, and the McCarl subsite is located in the southwest quarter of Section 22 (Attachment 1). The Baier subsite encompasses approximately 3.5 acres and is accessible by County Road X-23. The McCarl subsite encompasses approximately 1.25 acres located in a largely undeveloped, wooded area.

Land and Resource Use

Land use in the vicinity of the subsites was in the past and continues to be agricultural with some scattered residences. There is a residence on property adjacent to the McCarl subsite. Land use in the vicinity of the subsites is not anticipated to change substantially in the future.

Groundwater at the McCarl and Baier subsites was encountered in perched, shallow water-bearing zones at approximately 20 feet below ground surface (bgs). A deeper groundwater zone is found at approximately 60 feet bgs. The upper and lower water-bearing zones are separated by a confining unit. The shallow water-bearing unit did not provide enough yield to serve as a source of drinking water.

History of Contamination

Between April 1949 and November 1953, wastes generated at Du Pont's paint manufacturing facility located in Fort Madison, Iowa, were deposited at waste disposal areas at the Baier and McCarl subsites. An estimated 48,000 to 72,000 55-gallon drums of waste were disposed at the two subsites. In addition to drummed wastes, paint waste was placed in trenches and burned. An estimate of the volume of material burned indicated that 4,500 to 7,000 tons of ash were present at the subsites. The Baier subsite was the primary disposal area; however, in inclement weather, when the Baier subsite was not accessible, wastes were disposed at the McCarl subsite.

Contamination in soil consisted primarily of metals, including lead, cadmium, chromium, and selenium, and organic compounds, including toluene, methylbenzene, total xylene, and naphthalene. Remedial investigation data from both sublimes indicated that the areal extent of lead contamination in soil defined the surface area of contamination and that lead contamination rapidly attenuated with depth, decreasing to the background level of 350 milligrams/kilogram (mg/kg) at four feet bgs.

Total xylenes, ethylbenzene, and selenium were the primary contaminants in the shallow groundwater at the Baier subsite. Selenium, lead, arsenic, barium, cadmium, and chromium were the contaminants found in groundwater at the McCarl subsite. Deep monitoring wells at both of the subsites were not found to be impacted by site-related contaminants.

Initial Response

The subsites were identified as sources of volatile organic compound (VOC) and metals contamination during initial EPA investigations conducted between 1983 and 1986. As a result of site contamination identified in soil and groundwater, the Du Pont County Road X-23 site was proposed for inclusion on the National Priorities List (NPL) in June 1988 and the listing became final in August 1990.

In January 1991 Du Pont completed Remedial Investigation and Feasibility Study Reports for the site. In April 1991, a Proposed Plan identifying the EPA's preferred remedy was presented to the public, starting the period for public comment.

Basis for Taking Action

Contaminants of concern in soil at the Baier and McCarl subsites, except as noted:

Inorganic Compounds	VOCs	Semi-volatile Compounds
Arsenic	Ethylbenzene	Bis(2-ethylhexyl)phthalate
Barium*	4-methyl-2-pentanone	2-methyl naphthalene
Cadmium	Toluene	Naphthalene
Chromium	1,1,1-trichloroethane**	
Copper*	Xylenes	
Lead		
Manganese*		
Selenium		
Zinc		

* Compound found at the McCarl subsite only.
** Compound found at the Baier subsite only.

In the Baseline Risk Assessment it was determined that exposures to soil at both subsites presented significant human health risks associated with a future land use scenario involving residential exposures. Increased health risks were found to be due to the noncarcinogenic effects of exposure to cadmium, chromium, selenium, and lead. It was also determined in the Baseline Risk Assessment that no exposure to contaminated groundwater would occur due to the low groundwater yield from the contaminated zone.

IV. Remedial Actions

Remedy Selection

The Record of Decision (ROD) for the Du Pont County Road X-23 site was signed by the Regional Administrator of EPA Region VII on May 28, 1991. Remedial Action Objectives (RAOs) were developed as a result of data collected during the remedial investigation to aid in the development and screening of remedial alternatives that were considered for the ROD. The RAOs for the site were:

- To prevent or minimize the potential for human exposure to contaminated soil and groundwater so that health-based allowable exposure limits are not exceeded; and

- To prevent or minimize the potential for future off site migration of contaminants.

The selected remedy in the ROD for soil was stabilization and solidification of all soil contaminated above risk-based levels into a solid monolith such that contaminants of concern would be unable to leach into the groundwater. All surface waste materials not amenable to the selected technology, such as scrap metal, grinding balls, filter, or drums, were required to be removed and disposed at an off site hazardous waste landfill prior to treatment of the soil. Following treatment, the treated soil was to be covered with a soil cap to protect the treated

material and prevent direct contact with human or ecological receptors. The protective cover was required to be graded and planted with vegetation to reduce erosion.

Covenants and deed notices on the future use of the site were included to ensure the integrity of the protective cover and the underlying, solidified soil mass and to prevent contact with the treated soil.

The selected remedy for groundwater was no action. Groundwater monitoring was required for a minimum of five years.

An Explanation of Significant Differences (ESD) was issued by EPA Region VII on May 11, 1992. It modified the treatment technology as described in the ROD so that stabilization/solidification of contaminated soil could be conducted on site and above ground instead of in situ. Contaminated soil from the McCarl and Baier subsites was consolidated at the Baier subsite, mixed with stabilizing/solidifying reagents, then placed within a monolith and covered with impermeable clay, clean topsoil, and a vegetative cover.

Remedy Implementation

In a Consent Decree (CD) entered into with the United States on April 23, 1992, Du Pont agreed to perform the remedial design/remedial action (RD/RA) and pay past costs associated with the cleanup of the site. The remedial design (RD) was conducted in conformance with the ROD as modified by the ESD. The RD was approved by the EPA on June 5, 1992.

The major components of the remedial action (RA), as stated in the ROD and modified by the ESD, include the following:

- Removal of surface debris not amenable to solidification, and subsequent disposal at an EPA-approved landfill;
- Excavation of contaminated subsurface material from both subsites exceeding 150 milligrams/kilogram (mg/kg) of chromium, 350 mg/kg of lead, 10 mg/kg of selenium, and 20 mg/kg of cadmium and placement in a stockpile for subsequent treatment and disposal at the Baier subsite;
- Stabilization/solidification of contaminated soil from both subsites;
- Construction of soil covers at each subsite to prevent human or ecological contact with the treated soil;
- Introduction of vegetation to prevent erosion of the soil covers;
- Inspection and evaluation of the site every five years; and
- Groundwater monitoring to ensure that no unacceptable contaminant

concentrations occur in groundwater in the future.

Further requirements for the RA were included in the Statement of Work, Appendix B of the CD, as follows:

- Soil contaminated above the cleanup levels was required to undergo stabilization/solidification to a depth of two feet below the waste/soil interface or to the known depth of metals contamination, whichever is deeper;

- Following treatment, the treated soil was required to be covered with a minimum of one foot of topsoil prior to grading and planting with suitable vegetation; and

- Erosion controls were required to be included in the RD and/or Inspection and Maintenance Plans, if necessary.

The performance criteria for the soil that is stabilized/solidified are as follows:

- Hydraulic conductivity less than or equal to 1×10^{-7} centimeters/second (cm/sec);

- Leachability test results demonstrating compliance with Toxicity Characteristic Leachability Procedure (TCLP) metals standards (lead and chromium < 5 milligrams per liter (mg/l); cadmium and selenium < 1 mg/l);

- Unconfined compressive strength (UCS) of 250 pounds per square inch (psi) with a minimum USC of 50 psi after seven days;

- Freeze/thaw resistance in accordance with American Society for Testing and Materials (ASTM) D4842; and

- Wet/dry testing in accordance with ASTM D4843, with samples for both tests demonstrating a weight loss of eight to ten percent or less at the conclusion of each of the durability testing procedures.

Prior to the start of RA construction activities, surface debris from both subsites was accumulated, characterized, and disposed at a hazardous waste landfill. Construction activities at the McCarl subsite began in August 1992 and were completed in September 1992. At the Baier subsite, construction activities began in March 1992 and were completed in October 1993. Delays were encountered in the work schedule at the Baier subsite due to wet ground conditions. The subsites were surveyed, cleared of trees and dense vegetation, and temporary surface water controls and access roads were constructed prior to the beginning of excavation activities.

A total of 2,408 cubic yards of contaminated soil was excavated from the McCarl subsite and transported to the Baier subsite, where it was stockpiled within the area of contamination awaiting treatment. The McCarl subsite was then backfilled with clean soil and covered with six inches of topsoil. The site was graded, fertilized, and seeded. A prefinal site inspection was conducted by the EPA at the McCarl subsite on September 29, 1992.

Excavation at the Baier subsite began with construction of a disposal trench. Once completed, contaminated soil from the trench location and the McCarl subsite were placed in the trench. A total volume of 6,795 cubic yards of contaminated soil was excavated from the Baier subsite and also placed in the trench.

Stabilization of the excavated soil was achieved by mixing the contaminated soil with water and approximately 20 percent Type 1 Portland cement. The stabilization process was completed directly in the disposal trench.

After chemical and physical performance testing of the stabilized material, a three foot thick layer of compacted clay followed by a one foot thick layer of topsoil was placed over the treated material. After placement of the topsoil, the disposal trench area was graded, fertilized, and seeded. A prefinal inspection was conducted by the EPA at the Baier subsite on September 10, 1993.

One year of quarterly groundwater sampling at the McCarl subsite began in September 1992 and then was conducted annually through September 1993. One year of quarterly groundwater sampling at the Baier subsite began in September 1993 and then was conducted annually through September 1996. Following the first five-year review in 1997 the groundwater monitoring was conducted biennially, in 1998 and 2000.

The site achieved construction completion status when the Preliminary Close Out Report was signed on September 29, 1993. The EPA and the State determined that all RA construction activities, including the implementation of institutional controls, were performed according to the specifications. The Final Close Out Report for the site was signed on August 1, 1994, and the site was deleted from the NPL on September 25, 1995.

System Operations/Operation and Maintenance

Du Pont continues to conduct long-term monitoring, inspection, and maintenance activities according to the Remedial Action Inspection and Maintenance Plan and the Groundwater Monitoring Plan, which were approved by the EPA. The primary activities associated with the operation and maintenance (O&M) of the remedy include the following:

- Groundwater monitoring of the shallow and deeper water-bearing zones which has been conducted biennially since the first five-year review;
- Inspection of the condition of groundwater monitoring wells;
- Inspection of the condition of the ground cover including the cap at the Baier subsite and the vegetation; and
- Inspection of the condition of site fencing.

As is obvious when reviewing the O&M costs given in Table 2, the costs are significantly lower in the years when groundwater sampling was not required. The estimate for O&M costs

that were included in the ROD were approximately $12,000 per year. In the past five years these costs have been significantly higher, on average, but are expected to decrease as the amount of groundwater sampling is reduced. It is expected that the average annual O&M costs may fall below the estimate in the ROD during the next five years.

Table 2
Annual Operation and Maintenance Costs

Year	Total Cost rounded to nearest $1,000
1997	$64,000
1998	24,000
1999	3,000
2000	26,000
2001	4,000

V. Progress Since the Last Review

The protectiveness statement in the first Five-Year Review Report was as follows: "The RA is believed to be protective of human health and the environment regarding stabilization of the contaminated soil and integrity of the soil cover."

There were three recommendations made in the first Five-Year Review Report. The first recommendation was that biennial groundwater monitoring continue for the next five years due to continued high levels of selenium reported in the shallow monitoring wells, with the samples analyzed for total metals. This sampling was conducted in September 1998 and September 2000. The second recommendation was that the site inspection and maintenance visits and report submittal continue at the rate of three times per year for the next five years. This has also been done. Du Pont was to provide soil sampling data of the soil cover at the Baier subsite. According to the Site Inspection and Maintenance Plan, the soil cover was to be sampled for pH, lime, nitrogen, potassium, and phosphorous in the third year following completion of the RA, which would have been in 1996. This sampling was conducted in May 1997. Based on the results of this sampling, fertilizer was applied to the Baier subsite in July 1997.

VI. Five-Year Review Process

Administrative Components

Du Pont was notified of the initiation of the five-year review on December 5, 2001. The five-year review was conducted by Diana Engeman of the EPA, Remedial Project Manager for the Du Pont County Road X-23 site, with assistance by other members of the Regional technical staff. Robert Drustrup of the Iowa Department of Natural Resources and Melissa Lauterbach-Barrett of the Iowa Department of Public Health assisted in the review as representatives of

support agencies.

Community Involvement

In April 2002 a notice was placed in The Fort Madison Daily Democrat that a five-year review was to be conducted and provided information on how to contact the EPA to provide input. A letter stating the same, as well as a history of the site, was sent to elected officials, members of the media, and community members. The letter invited the recipients to submit any comments they might have to the EPA. No comments have been received.

Soon after approval of this Second Five-Year Review Report, a notice will be placed in the same local newspaper announcing that the Report is complete, and that it is available to the public at the Idol Raschid Memorial Library in Fort Madison, Iowa and the EPA RegionVII office.

Document Review

This five-year review consisted of a review of relevant documents including Inspection and Maintenance Plan Reports and Groundwater Monitoring Reports (Attachment 2).

Data Review

Site Inspection and Maintenance

The plan for site inspection and maintenance is included in the Remedial Action Inspection and Maintenance Plan, which is Attachment 4 to the Remedial Design Report. According to this report, inspection and maintenance of the soil cover, vegetative cover, drainage channels, and the site in general were scheduled for three times per year for the first three years following completion of the RA to ensure continued integrity of the RA (1994, 1995 and 1996) and twice per year for the next seven years (1997 through 2003). Additionally, shallow soil sampling of the soil cover was to occur on the third, sixth, and ninth years following completion of the RA (1996, 1999, and 2002) to evaluate the need to apply lime or fertilizer to promote vegetation growth.

For this Five-Year Review Report, Site Inspection and Maintenance Reports submitted by Ray Krogmeier, Du Pont Environmental Resources, were reviewed for site visits conducted in July and October 1997; March, June, and October 1998; March, July, and October 1999; March, July, and October 2000; March, July, and October 2001; and March 2002. In the Site Inspection and Maintenance Reports, both the Baier and McCarl subsites were visually inspected regarding the condition of the soil and vegetative covers, development of erosion areas, development of natural drainage channels, and condition of the site fences.

Throughout the period of time since the first five-year review the vegetation has continued to be well established at both subsites. Fertilizer was applied at the Baier subsite in July 1997. The only maintenance issue related to fencing during the past five years occurred at the Baier subsite and involved the removal of a tree limb and the repair of the fence in April

1998 and the removal of tree branches in March 2000.

Peeling of the paint on some monitoring well casing was noted at both subsites in July 1997 and the casings were scraped and repainted. The well casings at the Baier subsite were painted again in June 1998 and at the McCarl subsite in April 1999. No other significant issues were identified related to the monitoring wells in the past five years.

Beginning with the inspection of the McCarl subsite in March 1998 an area of erosion in the northeast drainage channel was observed. This area was observed and monitored until rip rap was placed in the channel in October 2000. Since that time there does not appear to be any significant deepening of this drainage channel.

The shallow soil sampling at the Baier subsite to determine if sufficient nutrients were in the soil for vegetation growth, which was to have been conducted in October 1999 per the Inspection and Maintenance Plan, was not done according to Du Pont. This is a deficiency in meeting the requirements of the Site Inspection and Maintenance Plan.

Groundwater Monitoring

Groundwater monitoring of the shallow and deeper water-bearing zones, which has been conducted biennially since the first five-year review, was performed at both subsites in September 1998 and September 2000. Groundwater monitoring is conducted according to the Groundwater Monitoring Plan, which is Attachment 5 to the Remedial Design Report. Attachments 3 and 4 to this report are figures showing monitoring well locations for the Baier and McCarl subsites, respectively.

During both rounds of sampling, water level measurements were taken in the monitoring wells at both subsites to determine the direction of groundwater flow in both water-bearing zones at both subsites. At the Baier subsite, groundwater in the shallow water-bearing zone flowed to the west and southwest and in the deep water-bearing zone, groundwater flowed to the southwest. At the McCarl subsite, groundwater in the shallow water-bearing zone flowed to the northeast and in the deep water-bearing zone, groundwater flowed to the southwest. All of these data are consistent with historical data.

Although there are no cleanup levels for groundwater in the ROD for either subsite since there was no exposure pathway for groundwater, groundwater monitoring results have been compared against the EPA Maximum Contaminant Levels (MCLs) for drinking water. MCLs, which are set forth at 40 CFR Part 141, are the permissible level of a contaminant in water which is delivered to any user of a public water system. Summaries of the groundwater monitoring results may be found in Attachments 5 through 12. The compounds which have been found to exceed MCLs since the first five-year review are selenium, which has an MCL of 50 µg/l; thallium, which has an MCL of 2 µg/l; and antimony, which has an MCL of 6 µg/l. Of these compounds, only selenium was identified as a compound of concern during the baseline risk assessment. It should also be noted that the MCL for arsenic was reduced from 50 µg/l to 10 µg/l since the last round of groundwater sampling. There have been no exceedances of the new MCL for arsenic at either subsite in the past five years.

In the shallow water-bearing zone at the Baier subsite, selenium was found at levels exceeding the MCL at monitoring wells BRA-1S (152 µg/l in 1998 and 148 µg/l in 2000) and BRA-2S (57.9 µg/l in 2000). Thallium was also found in this zone at levels exceeding the MCL at monitoring well BRA-2S (8.2 µg/l in 1998). Based on the direction of groundwater flow in this zone at the Baier subsite, both of these monitoring wells are upgradient of the area of contamination.

During 1998, in the deep water-bearing zone at the Baier subsite, thallium was found at a level of 7.1 µg/l at monitoring well BRA-1D. Also during 1998, antimony was found in this zone at a level of 6.9 µg/l in monitoring well BRA-3D. Well BRA-1D is an upgradient well and BRA-3D is a downgradient well. During the remedial investigation no connection between the two water-bearing zones was found.

In the shallow water-bearing zone at the McCarl subsite, selenium was found at levels exceeding the MCL at monitoring wells MRA-2S (97.3 µg/l in 1998 and 83.5 µg/l in 2000) and in MRA-3S (111 µg/l in 1998 and 110 µg/l in 2000). Thallium was also found in this zone at levels exceeding the MCL at monitoring wells MRA-1S (8.8 µg/l in 1998 and 6.8 µg/l in 2000), MRA-2S (4.6 µg/l in 1998) and MRA-4S (4.6 µg/l in 1998). Of these monitoring wells, only MRA-1S is an upgradient well.

During 1998, thallium was found at 5.9 µg/l at monitoring well MRA-2D in the deep water-bearing zone at the McCarl subsite. This monitoring well is downgradient of the site. During the remedial investigation no connection between the two water-bearing zones at this subsite was found.

The monitoring results in 1998 and 2000 were fairly consistent with results from previous groundwater monitoring with the exception of elevated levels of thallium and antimony found in the deep water-bearing zone at the Baier subsite in 1998 and the one elevated level of thallium found in the deep water-bearing zone at the McCarl subsite in 1998. Due to the lack of connectivity of the two water-bearing zones this finding is not especially significant and may be more indicative of naturally occurring levels of these compounds.

Site Inspection

An inspection of both of the subsites was conducted on March 28, 2002, by the EPA RPM and an EPA grantee (Attachment 13). The purpose of the inspection was to assess the protectiveness of the remedy, including the condition of the fencing, the integrity of the cap at the Baier subsite, the condition of the monitoring wells, and compliance with the institutional controls. Just prior to our inspection, Du Pont obtained a copy of the Declaration of Covenants and Restrictions from the Recorder of Deeds of Lee County, Iowa.

The McCarl subsite is fenced on the east, west, and south sides. The north side of the subsite is not fenced due to the deep ravine on that side. There is a locked gate on the south side of the site. There is no cap on this subsite as all of the contaminated soil exceeding the action levels in the ROD was excavated and moved to the Baier subsite for treatment. The vegetation

at the McCarl subsite was found to be in good condition. A drainage channel in the northeast portion of the subsite had been filled with large rock to minimize erosion. All groundwater monitoring wells at the subsite were found to be locked and in good condition.

The Baier subsite is fenced on all sides with a locked gate in the northeast corner. The vegetation at the subsite was found to be in good condition with no evidence of erosion on the cap of at any other area of the subsite. All groundwater monitoring wells at the subsite were found to be locked and in good condition.

The institutional controls that are in place cover both subsites and include a requirement that the properties be fenced and there not be any residential, civic, recreational, or agricultural uses. Installation of water wells on the properties is also prohibited. No activities were observed that would have violated the institutional controls.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The review of site documents, applicable or relevant and appropriate requirements (ARARs), risk assumptions, and the results of the site inspection indicate that the remedy is continuing to function as intended by the ROD, as modified by the ESD. The excavation, stabilization/solidification, and capping of contaminated soil has achieved the remedial objectives of preventing or minimizing the potential for human exposure to contaminated soil and groundwater and to prevent or minimize the potential for future off site migration of contaminants. The effective implementation of institutional controls also prevents exposure to contaminated soil and groundwater as well as ingestion of contaminated groundwater.

Operation and maintenance of the cap has been effective. Maintenance has been performed on schedule and appears to be effective. While the costs in the past five years exceed the estimate in the ROD of approximately $12,000, they do not appear to be excessive and it is anticipated that they will continue to decrease in the future.

The relative stability of the groundwater monitoring results at the Baier subsite throughout the implementation of the remedy, is indicative that the solidified soil with its clay cap is stable. All of the contaminated soil from the McCarl subsite was excavated, treated, and disposed at the Baier subsite. The stability of the groundwater monitoring results at the McCarl subsite are indicative of the effectiveness of this portion of the remedy.

The institutional controls that are in place include a requirement that the properties be fenced and there not be any residential, civic, recreational, or agricultural uses. Installation of water wells on the properties is also prohibited. No activities were observed that would have violated the institutional controls. The capped area and the surrounding area were undisturbed, and no new uses of groundwater were observed. The subsites remain fenced as previously described.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial

action objectives (RAOs) used at the time of remedy selection still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There have been no changes in the land use assumptions that would affect the protectiveness of the remedy.

Changes in Standards and To Be Considereds

After issuance of the ROD in 1991, the EPA adopted a number of MCLs for drinking water. For contaminants listed in the ROD, MCL values became more stringent for all compounds except cadmium and arsenic. The previous MCL for cadmium was 10 µg/l and the current MCL is 5 µg/l. The previous MCL for arsenic was 50 µg/l and the current MCL is 10 µg/l. Because there is no exposure to the contaminated groundwater, and because the underlying aquifer has not been impacted, no action was taken at the site for the remediation of groundwater. There are no federal or state ARARs for the selected "no action" alternative because compliance with federal and state ARARs is not required as no remedial action is necessary to protect human health and the environment. The remedy continues to be protective.

Chemical-specific soil cleanup levels stated in the ROD were 350 mg/kg for lead; 150 mg/kg for chromium; 10 mg/kg for selenium, and 20 mg/kg for cadmium. Soil exceeding these levels at both subsites was excavated, treated, and then capped at the Baier subsite. For comparison purposes, EPA Region IX preliminary remediation goals (PRGs) are used as soil screening levels in Region VII. Currently, the Region IX PRGs, assuming residential use of a site, for the contaminants are all higher (400 mg/kg, 210 mg/kg, 390 mg/kg, and 37 mg/kg for lead, chromium, selenium, and cadmium respectively) than the cleanup values for this site. Contaminated soil was removed from the McCarl subsite and transported to the Baier subsite. Therefore, the residual soil at the McCarl subsite should not exceed the soil cleanup levels. Solidified/stabilized soil with contaminant concentrations above specified cleanup levels remains at the Baier subsite beneath an engineered cap. The remedy continues to be protective.

Changes in Exposure Pathways, Toxicity, and other Contaminant Characteristics

Groundwater continues to remain an incomplete exposure pathway. Risk posed by exposure to contaminated soil has been eliminated by: 1) the removal of contaminated soil and the placement of a vegetated cap at the McCarl subsite, and 2) the solidification of contaminated soils followed by the placement of a low permeability clay layer overlain by a vegetated soil cap at the Baier subsite.

Toxicity values for metals used for risk characterization have changed since the completion of the risk assessment (Table 3). For some of these contaminants the toxicity value has increased. However, due to remediation activities (soil removal, solidification, and the placement of vegetative soil caps), no exposure to contaminated media is occurring.

Table 3
Comparison of Past and Current Toxicity Values

	Risk Assessment Toxicity Value		Current Toxicity Value	
Chemical	SFo	RfDo (mg/kg/day)	SFo	RfDo (mg/kg/day)
Arsenic	1.75	1.00e-03	1.5	3.00e-04
Barium	---	5.00e-02	---	7.00e-02
Cadmium	---	1.00e-03	---	5.00e-04
Chromium	---	5.00e-03	---	3.00e-03
Copper	--	1.30e+00	--	3.71e-02
Lead	NA	NA	NA	NA
Manganese	--	2.00e-01	--	2.00e-02
Selenium	--	3.00e-03	--	5.00e-03
Zinc	--	2.00e-01	--	3.00e-01

SFo - Oral Slope Factor
RfDo- Oral Reference Dose
NA - Not Applicable

The results of groundwater monitoring at the McCarl subsite have shown decreases in contaminant metal concentrations to levels below the MCLs for all contaminants of concern but selenium. Because the contaminated media has been removed from this subsite and there is no complete exposure pathway from this media to humans or sensitive environmental receptors, monitoring of this subsite is no longer necessary. Groundwater monitoring at the Baier subsite has shown similar results to that of McCarl. However, because contaminated media (solidified contaminated soil) remains on site, groundwater monitoring should continue at this subsite.

Evaluation of Remedial Action Objectives (RAOs)

The response actions taken address the principal threats posed by this site and continue to protect human health and the environment through; 1) the prevention of human exposure to contaminants in soil and groundwater by contaminated soil removal, solidification, placement of a vegetated soil cap, and covenants and deed notices, and 2) the minimization of off site migration of contaminated groundwater by solidification of contaminated soil as well as the placement of a low permeability clay layer followed by top soil at the Baier subsite. Therefore, the RAOs are effectively being met.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No ecological targets were identified during the baseline risk assessment and none were identified during this five-year review, and therefore monitoring of ecological targets is not necessary. No weather-related events have affected the protectiveness of the remedy. There is

no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed and the site inspection, the remedy is functioning as intended by the ROD, as modified by the ESD. There have been no changes to the physical conditions of the site that would affect the protectiveness of the remedy. The ARARs cited in the ROD have been complied with. While there have been changes in some of the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, as shown in Table 3, due to the remediation activities no exposure to contaminated media is occurring and therefore toxicity has no bearing. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There have been no changes in land usage that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

Table 4
Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Failure to perform analysis of soil cover in 1999	N	Y
Schedule for future groundwater monitoring needs to be determined	N	Y
Schedule for future inspection and maintenance activities needs to be determined	N	Y

IX. Recommendations and Follow-up Actions

For all of the recommendations and follow-up actions listed in Table 5, Du Pont is the party responsible for implementing the actions and the EPA is the oversight agency. The Iowa Department of Natural Resources will be kept informed of activities at the site.

Table 5
Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Milestone Date	Affects Protectiveness (Y/N)	
			Current	Future
Failure to perform analysis of soil cover in 1999	Soil cover at the Baier subsite to be sampled in 2002 and lime and fertilizer applied as needed to promote vegetation growth.	12/31/02	N	Y
Schedule for future groundwater monitoring needs to be determined	At the Baier subsite, groundwater monitoring for total metals will continue biennially, including 2002, for the next five years in accordance with the Groundwater Monitoring Plan. At the McCarl subsite, groundwater monitoring will be discontinued immediately and all monitoring wells properly abandoned per the Groundwater Monitoring Plan.	Monitoring 2002, 2004, and 2006. Wells abandoned by 12/31/02.	N	Y
Schedule for future inspection and maintenance activities needs to be determined	Routine inspection at both subsites to occur twice per year for next five years. Soil cover at the Baier subsite to be sampled in 2005 and lime and fertilized added as needed.	Inspect Mar. and Oct. Sample and treat by 12/31/05.	N	Y

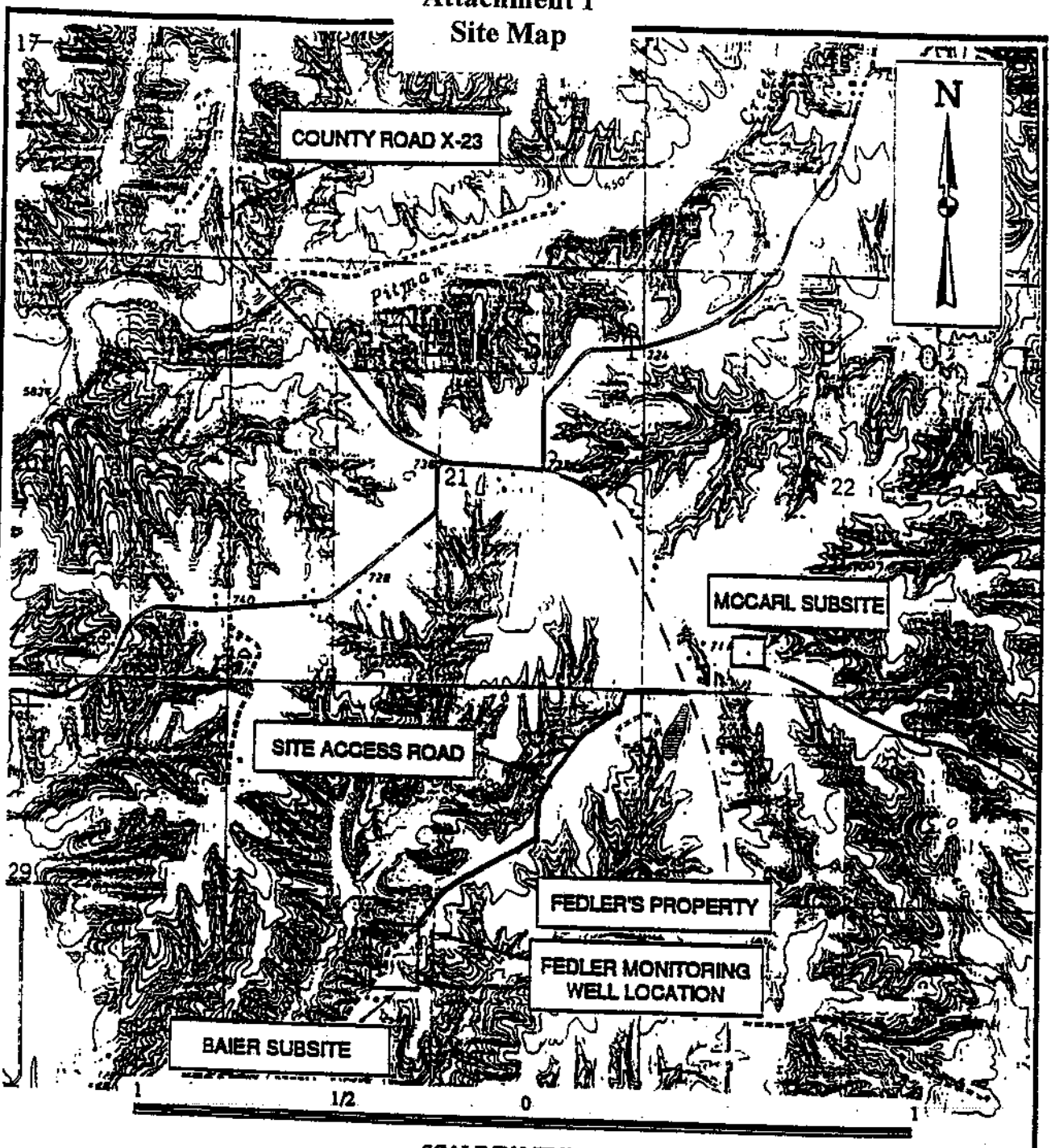
X. Protectiveness Statement

The remedy at the Du Pont County Road X-23 site is protective of human health and the environment.

XI. Next Review

The next five-year review for the Du Pont County Road X-23 Superfund site is required by August 16, 2007, five years from the date of this review.

Attachment 1
Site Map



SCALE IN MILES
Contour Interval: 10 feet
National Geodetic Vertical Datum of 1929

WEST POINT QUADRANGLE
IOWA-LEE CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

Source: Jacobs Engineering. January 1990.

DuPont X23 Site Lee County, Iowa	Site Location Map	Figure No.: 2.1
CDM Federal Programs Corporation A subsidiary of Camp Dresser & McKee Inc.		3/97

COREL TITLE

Attachment 2
List of Documents Reviewed

2000 Groundwater Monitoring Report for the County Road X23 Superfund Site, Lee County, Iowa, January 2001

Annual Groundwater Monitoring Report for the County Road X23 Baier and McCarl Superfund Site, Lee County, Iowa, January 20, 1999

Consent Decree, United States of America v. E. I. Du Pont De Nemours & Company, May 21, 1992

Cost Summary: Baier/McCarl Project (1997-2001), June 18, 2002

Explanation of Significant Differences for the Du Pont County Road X23 Superfund Site, Lee County, Iowa, May 11, 1992

Five-Year Review Du Pont County Road X23 Site, Lee County, Iowa, June 19, 1997

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, July 22, 1997

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, November 4, 1997

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, April 9, 1998

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, June 24, 1998

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, October 30, 1998

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, March 22, 1999

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, July 12, 1999

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, October 13, 1999

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, March 20, 2000

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, August 4, 2000

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, November 8, 2000

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, April 2, 2001

Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, July 6, 2001

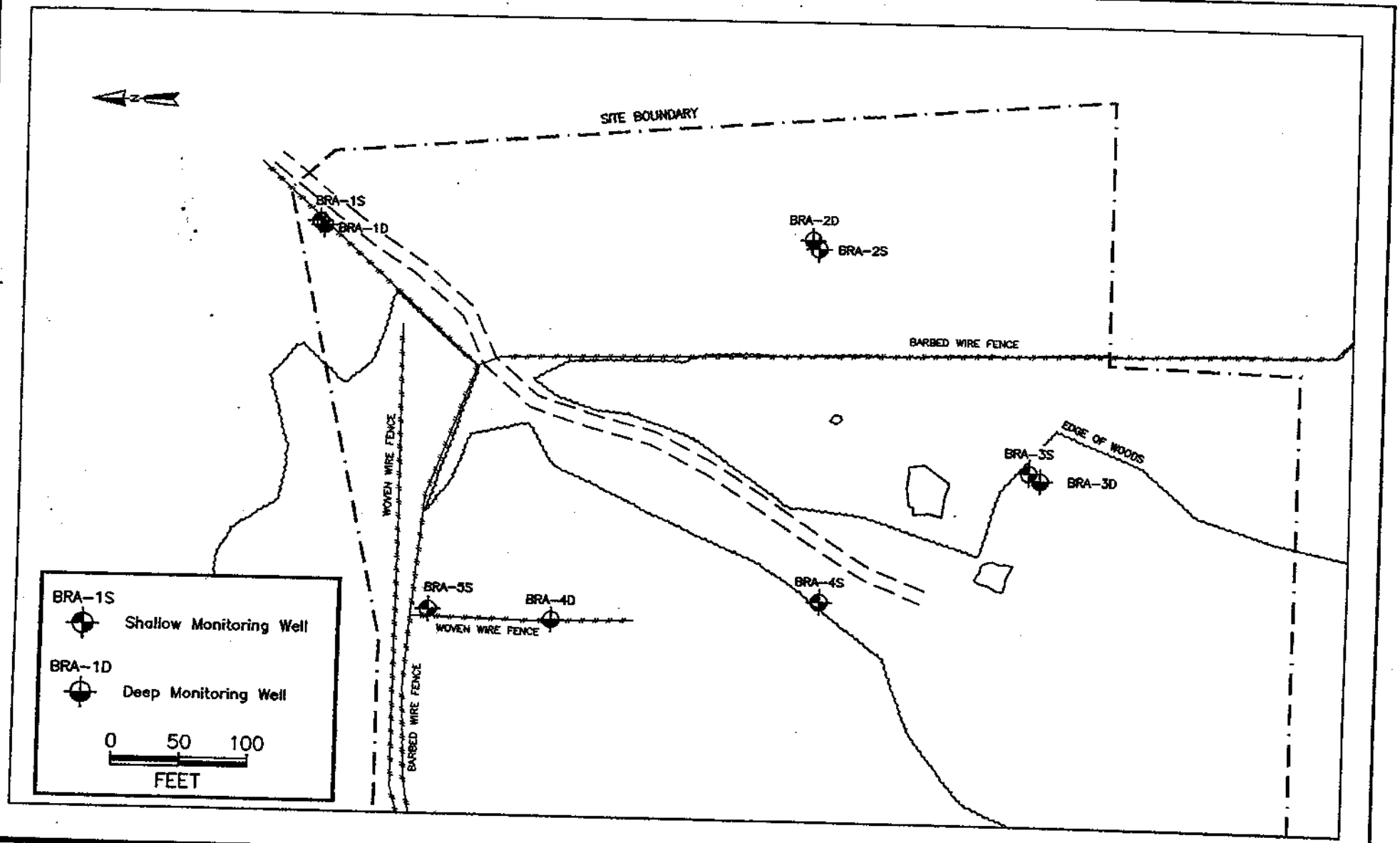
Inspection and Maintenance Plan Report for E. I. duPont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, October 3, 2001

Iowa State University of Science and Technology, Soil Testing Laboratory, June 9, 1997

Remedial Design Report, Final Design Submittal Baier Site and McCarl Site, Lee County, Iowa, May 1992

Superfund Record of Decision: E. I. Du Pont De Nemours (County Rd X23), Iowa, May 1991

Attachment 3



28

DUPONT

Corporate Remediation Group

An Alliance between DuPont and The W-C Diamond Group

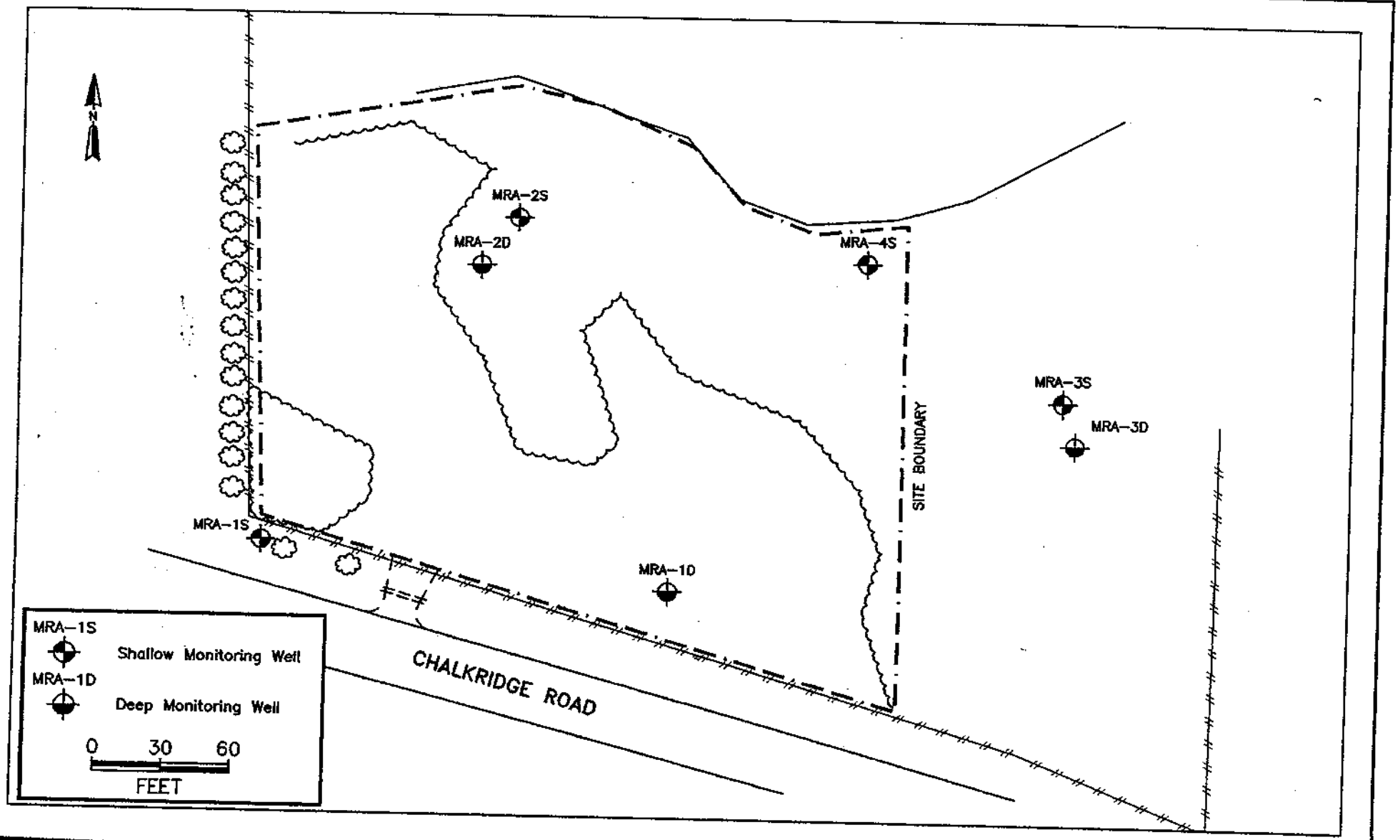
Barley Mill Plaza, Building 27
Wilmington, Delaware 19880-0027

TITLE:

Monitoring Well Location Map
DuPont Baier Site

DWN: DHE	DES.:	FILE NUMBER:	
CHKD:	APPD:		
DATE: 10/05/2000	REV.:	FIGURE NO.:	

Attachment 4



DUPONT

Corporate Remediation Group

An Alliance between DuPont and The E–C Diamond Group

Barley Mill Plaza, Building 27
Wilmington, Delaware 19880–0027

TITLE:

Monitoring Well Location Map
DuPont McCarl Site

DWN: DHE	DES.:	FILE NUMBER:	
CHKD:	APPD:		
DATE: 10/05/2000	REV.:	FIGURE NO.:	

Attachment 5

Detected Analytes (Total Metals) - September 1998

Baier Landfill - Shallow Water Bearing Zone

	BRA-1S	BRA-2S	BRA-3S	BRA-3S*	BRA-4S	BRA-5S	EQBLK1	MCL
Aluminum	2130	358	3320	3190	65.4 B	1290		50**
Antimony								6
Arsenic								50
Barium	107 B	66.8 B	98.5 B	94.4 B	145 B	175 B		2000
Beryllium	0.27 B	0.17 B	0.3 B	0.27 B				4
Cadmium								5
Calcium	150000	166000	186000	182000	107000	265000	73.3 B	—
Chromium	5.4 B	1.8 B	3.8 B	3.4 B		4.3 B		100
Cobalt	2.3 B	1.6 B	7.8 B	7.9 B	1.4 B	3 B		—
Copper	3.8 B		4.5 B	5.6 B		3.5 B		1300***
Iron	3450	522	2750	2750	176	2280		300**
Lead							3.3	15***
Magnesium	56300	72600	78100	75600	40700	99600		—
Manganese	112	523	1290	1300	497	313	0.28 B	50**
Mercury	0.093 B	0.064 B	0.12 B	0.085 B	0.03 B	0.053 B	0.081 B	2
Nickel	5.8 B	6.6 B	19.8 B	20.2 B	7 B	11.4 B		100
Potassium	2130 B	3760 B	3200 B	3340 B	1900 B	3230 B	117 B	—
Selenium	152	27.3	21.5	17.6				50
Silver								100**
Sodium	40200	54200	63800	69600	37100	51400	172 B	—
Thallium		8.2 B						2
Vanadium	7.4 B	2.6 B	7.6 B	7.5 B	1.4 B	5.5 B		—
Zinc	17.7 B	9.2 B	20.5	18.4 B	9.3 B	14.5 B	13.2 B	5000**

Notes:

Concentrations are listed only if detected.

Units are ug/l.

B: Estimated Since Concentration < PQL

*: Duplicate

**: Secondary MCL (not enforceable, based on aesthetics qualities only)

***: Action Level

Attachment 6

Detected Analytes (Total Metals) - September 1998

Baier Landfill - Deep Water Bearing Zone

	BRA-1D	BRA-2D	BRA-3D	BRA-4D	EQBLK4	MCL
Aluminum	81.3 B					50**
Antimony			6.9 B			6
Arsenic						50
Barium	122 B	108 B	143 B	50.4 B		2000
Beryllium	0.16 B					4
Cadmium						5
Calcium	93500	58400	64300	175000	60.8 B	---
Chromium		1.1 B		1.1 B		100
Cobalt	1.7 B		2.4 B	3.1 B		---
Copper						1300***
Iron	328	359	69.9 B	599		300**
Lead		3.6	2.5 B			15***
Magnesium	29800	22200	27500	73500		---
Manganese	735	157	784	698	3.1 B	50**
Mercury	0.032 B	0.064 B	0.15 B	0.12 B	0.14 B	2
Nickel	3.4 B		5.9 B	6.1 B		100
Potassium	2930 B	9550	4510 B	3860 B	132 B	---
Selenium	4.7 B					50
Silver						100**
Sodium	48700	48700	50900	75500	226 B	---
Thallium	7.1 B					2
Vanadium	1.2 B	1.2 B	1.1 B	1.6 B		---
Zinc	9.7 B	7.6 B	9.5 B	7.9 B	10.7 B	5000**

Notes:

Concentrations are listed only if detected.

Units are ug/l.

B: Estimated Since Concentration < PQL

*: Duplicate

**: Secondary MCL (not enforceable, based on aesthetics qualities only)

***: Action Level

Attachment 7

Detected Analytes (Total Metals) - September 1998

McCarl Landfill - Shallow Water Bearing Zone

	MRA-1S	MRA-2S	MRA-3S	MRA-4S	EQBLK2	MCL
Aluminum	2730	849	49.7 B	1240		50**
Antimony						6
Arsenic	9 B					50
Barium	93.6 B	67.6 B	344	169 B	0.33 B	2000
Beryllium	0.78 B	0.99 B	0.91 B	0.94 B	0.87 B	4
Cadmium	0.32 B					5
Calcium	87000	138000	124000	338000	56.4 B	---
Chromium	5.6 B	1.8 B	2.1 B	2.4 B	0.98 B	100
Cobalt	3.2 B			6.1 B		---
Copper	19.2 B		1.5 B	5 B		1300***
Iron	5120	1000	78.2 B	2460		300**
Lead	5.4					15***
Magnesium	34700	47500	40600	108000		---
Manganese	197	38.6	6.3 B	365	0.28 B	50**
Mercury	0.1 B	0.11 B	0.16 B	0.14 B	0.11 B	2
Nickel	6 B	2.3 B		13.9 B		100
Potassium	2050 B	1360 B	1930 B	4380 B	113 B	---
Selenium	7	97.3	111	4.9 B		50
Silver		0.94 B		1.4 B		100**
Sodium	41900	51100	28500	96800	189 B	---
Thallium	8.8 B	4.6 B		4.6 B	5.8 B	2
Vanadium	8.3 B	2.6 B		4.6 B		---
Zinc	40.4	11 B	15.4 B	14.7 B	10.8 B	5000**

Notes:

Concentrations are listed only if detected.

Units are ug/l.

B: Estimated Since Concentration < PQL

*: Duplicate

**: Secondary MCL (not enforceable, based on aesthetics qualities only)

***: Action Level

Attachment 8

Detected Analytes (Total Metals) - September 1998
McCarl Landfill - Deep Water Bearing Zone

	MRA-1D	MRA-2D	MRA-3D	MRA-3D*	EQBLK3	MCL
Aluminum						50**
Antimony						6
Arsenic						50
Barium	54.2 B	113 B	145 B	144 B		2000
Beryllium	0.73 B	0.79 B	0.71 B	0.75 B	0.7 B	4
Cadmium						5
Calcium	150000	71900	86200	85900		---
Chromium					0.76 B	100
Cobalt	4.6 B		3.5 B	2.7 B		---
Copper						1300***
Iron	154		178	174		300**
Lead						15***
Magnesium	36700	26000	27800	27700		---
Manganese	1420	253	525	526	0.37 B	50**
Mercury	0.18 B	0.18 B	0.16 B	0.21	0.15 B	2
Nickel	9.8 B		3.4 B	3.1 B		100
Potassium	4370 B	3550 B	3160 B	3140 B	122 B	---
Selenium						50
Silver						100**
Sodium	79500	65800	53900	51400	289 B	---
Thallium		5.9 B				2
Vanadium	0.85 B				0.75 B	---
Zinc	9.8 B	9.1 B	7.2 B	7.9 B	7.6 B	5000**

Notes:
Concentrations are listed only if detected.
Units are ug/l.

B: Estimated Since Concentration < PQL

*: Duplicate

**: Secondary MCL (not enforceable, based on aesthetics qualities only)

***: Action Level

Attachment 9
Detected Analytes (Total Metals) - September 2000
Baier Landfill - Shallow Water Bearing Zone

	BRA-1S	BRA-2S	BRA-3S	BRA-4S	BRA-5S	MCL
Aluminum		307	3620	129 B		50**
Antimony	5.6 B					6
Arsenic						50
Barium	61.1	92.7 B	113	96.5 B	40 B	2000
Beryllium			0.32 B			4
Cadmium		0.39 B	0.35 B	0.32 B	0.49 B	5
Calcium	160000	147000	211000	88800	282000	---
Chromium		4.7 B	3.9 B	3.7 B		100
Cobalt	0.88 B		13.1 B		2.6 B	---
Copper		2.2 B	8.8 B	3.1 B	1.2 B	1300***
Iron		709	5100	196	83.3 B	300**
Lead			3.6			15***
Magnesium	59000	59200	86200	32800	101000	---
Manganese		189	1410	111	2180	50**
Mercury			0.034 B		0.049 B	2
Nickel	2.9 B	4.5 B	21.4 B	4.2 B	40.1	100
Potassium	1640 B	12400	3160 B	1740 B	3400 B	---
Selenium	148	57.9	20			50
Silver						100**
Sodium	42000	50400	54700	27000	49800	---
Thallium						2
Vanadium	1.8 B	2.3 B	7.4 B	1.8 B	1.2 B	---
Zinc	2.2 B	1.3 B	20 B	3 B	5.6 B	5000**

Notes:
Concentrations are listed only if detected.
Units are µg/l.
MCL: Maximum Contaminant Level
B: Estimated value since concentration detected is < Practical Quantitation Limit (PQL)
**: Secondary MCL (not enforceable, based on aesthetic qualities only)
***: Action Level

Attachment 10
Detected Analytes (Total Metals) - September 2000
Baier Landfill Deep Water Bearing Zone

	BRA-1D	BRA-2D	BRA-3D	BRA-4D	MCL
Aluminum	83.2 B				50**
Antimony					6
Arsenic					50
Barium	121 B	123 B	134 B	49.9 B	2000
Beryllium					4
Cadmium				0.31 B	5
Calcium	98900	85500	70900	189000	---
Chromium			4 B	3.4 B	100
Cobalt	1.4 B	0.79 B	1.2 B	3.4 B	---
Copper			1.6 B		1300***
Iron	394	416	60.9 B	104	300**
Lead					15***
Magnesium	30500	33900	30100	77500	---
Manganese	581	291	589	1330	50**
Mercury			0.044 B	0.032 B	2
Nickel	3.9 B	1.9 B	10.3 B	7.2 B	100
Potassium	2970 B	3190 B	3950 B	4000 B	---
Selenium					50
Silver					100**
Sodium	46500	49900	52900	66500	---
Thallium					2
Vanadium	1.2 B	1.1 B	1 B	1 B	---
Zinc			2.8 B		5000**

Notes:
Concentrations are listed only if detected.
Units are µg/l.
MCL: Maximum Contaminant Level
B: Estimated value since concentration detected is < Practical Quantitation Limit (PQL)
**: Secondary MCL (not enforceable, based on aesthetic qualities only)
***: Action Level

Attachment 11
Detected Analytes (Total Metals) - September 2000
McCarl Landfill - Shallow Water Bearing Zone

	MRA-1S	MRA-2S	MRA-3S	MRA-4S	MCL
Aluminum	551 B	87.5 B		65.4 B	50**
Antimony	3.1		3.4 B		6
Arsenic	3.1 B				50
Barium	34.4 B	66.1 B	239	36 B	2000
Beryllium					4
Cadmium					5
Calcium	33100	144000	139000	285000	---
Chromium	2.8 B				100
Cobalt	1.1 B			3.2 B	---
Copper	21.5 B			1.2 B	1300***
Iron	1100	186	33.6 B	183	300**
Lead					15***
Magnesium	25700	50300	43400	97900	---
Manganese	59.5	29.1	8.6 B	314	50**
Mercury					2
Nickel	2.7 B	1.9 B	0.93 B	9.5 B	100
Potassium	2860 B	1420 B	1630 B	3950 B	---
Selenium	4.1 B	8305	110	41.5	50
Silver					100**
Sodium	52300	52800	26400	120000	---
Thallium	6.8 B				2
Vanadium	3.2 B	2.3 B	1.1 B	2.1 B	---
Zinc	27	1.8 B	1.9 B		5000**

Notes:
Concentrations are listed only if detected.
Units are µg/l.
MCL: Maximum Contaminant Level
B: Estimated value since concentration detected is < Practical Quantitation Limit (PQL)
**: Secondary MCL (not enforceable, based on aesthetic qualities only)
***: Action Level

Attachment 12
Detected Analytes (Total Metals) - September 2000
McCarl Landfill - Deep Water Bearing Zone

	MRA-1D	MRA-2D	MRA-3D	MCL
Aluminum	99.2 B			50**
Antimony	3 B	2.4 B		6
Arsenic				50
Barium	64.3 B	112 B	158 B	2000
Beryllium				4
Cadmium				5
Calcium	156000	70700	89100	---
Chromium				100
Cobalt	4.6 B	0.95 B	4.5 B	---
Copper		0.88 B		1300***
Iron	1130	29.9 B	139	300**
Lead				15***
Magnesium	37300	25200	28200	---
Manganese	1910	207	840	50**
Mercury				2
Nickel	5.6 B	2.9 B	6.8 B	100
Potassium	4600 B	3760 B	3420 B	---
Selenium				50
Silver				100**
Sodium	74700	65500	54200	---
Thallium				2
Vanadium	1.1 B	2 B	0.74 B	---
Zinc		2.6 B	2.1 B	5000**

Notes:
Concentrations are listed only if detected.
Units are µg/l.
MCL: Maximum Contaminant Level
B: Estimated value since concentration detected is < Practical Quantitation Limit (PQL)
**: Secondary MCL (not enforceable, based on aesthetic qualities only)
***: Action Level

Attachment 13

April 15, 2002

MEMORANDUM

SUBJECT: Trip Report to Du Pont County Road X-23 Site (Baier Subsite & McCarl Subsite), Fort Madison, Lee County, Iowa

FROM: Victor Walkenhorst, Technical Advisor, SEE Program, MOKS Branch

TO: Diana Engeman, Remedial Project Manager (RPM), MOKS Branch
Steve Kovac, Branch Chief, MOKS Branch

The site meeting and subsequent site visit to the Baier and McCarl Subsite was scheduled for 9:00 am on Thursday, March 28, 2002 at the Du Pont office in Fort Madison, IA.

My trip to Fort Madison, was completed on Wednesday, March 27, 2002. I met Diana Engeman at the Du Pont Security office at approximately 9:00 am on Wednesday, March 28. We were met by Du Pont representatives Ray Krogmeier and Joseph Auge at the plant security office. The first part of the meeting was held in a conference room in the Du Pont plant office building.

Diana Engeman stated the purpose of our site visit was to review the Baier and McCarl Subsites as we were preparing an Environmental Protection Agency(EPA) Five Year Review for the Du Pont County Road X-23 Site. One of the requirements of the five year report is a site visit to determine the physical condition of the fencing, gates, monitoring wells, site maintenance and overall condition of the subsites.

Ray Krogmeier and Joe Auge stated that Du Pont had been maintaining the site fencing and gates, maintenance of the site cover and monitoring wells at both sites and they further stated that Du Pont has complied with the Consent Decree to conduct groundwater monitoring and sampling. The last groundwater monitoring and sampling event was completed the later part of 2000 and the report was dated January 2001. They further stated that Du Pont has considered the possibility of having the McCarl Subsite converted to a Wild Life Refuge area. This had only been discussed within Du Pont. At this time Du Pont would like to know if there would be any objections from EPA to modifying the use of the McCarl Subsite in this manner. Diana Engeman responded that a review of the Consent Decree documents would be required to determine if there were any statements in the Consent Decree documents that would prevent this change in site usage. Diana also stated that the site documents would be reviewed to determine if there were any revisions required to allow the proposed change in the site usage. It was her opinion that this type of change in the site usage would be acceptable. Diana indicated that she would review the documents and advise Du Pont what revisions would be required to implement the wild life refuge program at the Mc Carl Subsite. This concluded this of the meeting. Ray Krogmeier stated that a Du Pont company vehicle available to review the sites.

We traveled first to the McCarl Subsite which is located on Chalkridge Road off of County Road X-23 and then we traveled to the Baier Subsite, which is located west and south of the McCarl Subsite, and is also accessible from County Road X-23 by a site access road on the Fedler's farm property. The distance between the two sites is approximately 3/4 mile.

The McCarl Subsite is approximately 1.5 acres in area. The majority of the site area is level with a slight slope from the south side of the site at Chalkridge Road north to the north side of the site. The north east portion of the site has a steep slope to a drainage channel at the north east corner of the site.. Ray Krogmeier stated that Du Pont has placed large rocks at this location to reduce the erosion caused by the drainage channel. Also, they would be placing additional rock again this year in this area to reduce the erosion in the drainage path.

The McCarl Subsite is fenced on the south and west sides of the property line with steel fence posts and barbed wire fence material. The north side is not fenced due to the deep ravine on that side of the site. Also, the area east of the east side of the site is heavily wooded. There is a barbed wire fence on the east side of the site that is located approximately 120' east of the east site boundary. There is one locked gate on the south side of the site with an access drive off of Chalkridge Road onto the site. The entire area of the site has a good stand of vegetation and trees are not growing on the site.

There are a total of seven monitoring wells located at the site. There is one shallow background monitoring well located at the southwest corner of the site just off of the site property. There are two shallow and two deep monitoring wells located within the site boundary and one shallow and one deep monitoring well located approximately 80' east of the east site boundary. All monitoring wells are well marked and accessible.

The Baier Subsite is located south on County Road X-23 from the McCarl Subsite . The access to this site is approximately 5/8 miles southwest from County Road X-23 on a dirt site access road through the Fedler farm property.

The Baier Subsite is approximately 3.5 acres in area. The entire site perimeter fence consists of steel fence posts and barb wire fence material. The site is accessible through a locked gate at the northeast corner of the site. The entire site has a good growth of vegetation and no trees are growing on the site. Surface drainage from the site is mainly to the west and south of the site. The surface drainage is generally from east to west and the site does not appear to have any areas that are void of vegetation due to surface drainage especially at the west side of the site that has a large drop in elevation.

There are three shallow and two deep monitoring wells on the site and two shallow and two deep monitoring wells off of the site on the north and east side of the site. The monitoring wells are well marked and accessible.

This completed the review of the Du Pont County Road X-23 Site and we returned to the Du Pont Plant Security Office and signed out. I traveled to Kansas City, KS and returned at approximately 6:30 pm.